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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,347	11/26/2003	Thomas Flohr	32860-000662/US	6166

30596 7590 11/15/2005

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EXAMINER	
HORWAT, JENNIFER A	

ART UNIT	PAPER NUMBER
3737	

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/721,347	FLOHR ET AL.	
	Examiner	Art Unit	
	Jennifer Horwat	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/8/04 11/26/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement filed 11/26/2003 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Specification

3. The incorporation of essential material in the specification by reference to an unpublished U.S. application, foreign application or patent, or to a publication is improper. Applicant is required to amend the disclosure to include the material incorporated by reference, if the material is relied upon to overcome any objection, rejection, or other requirement imposed by the Office. The amendment must be accompanied by a statement executed by the applicant, or a practitioner representing the applicant, stating that the material being inserted is the material previously

incorporated by reference and that the amendment contains no new matter. 37 CFR 1.57(f).

4. The disclosure is objected to because of the following informalities: On page 6 of the specification, paragraph 20, the sentence "In order to avoid artifacts, it is further possible for the ET/CT unit to device(s) that that subject the extrapolated data to smoothing" appears to be missing words, in addition to the repetition of the word "that" in the sentence, making the sentence incomprehensible.

Appropriate correction is required.

Claim Interpretation

5. Claims 1-5, 12, and 24 appear to be attempting to invoke 35 U.S.C. 112, sixth paragraph due to the use of means plus functional language.

Claims 1 and 3 do not meet the requirements of the three-prong test due to the recitation of sufficient structure and acts for achieving the specified function. Claim 1 state, "using the distribution, examined by the CT, of the attenuation coefficients" which is sufficient acts for correcting the detected data. Claim 3 states, "by extrapolating cut projections" which is sufficient acts for obtaining the data outside of the measured field.

Claims 2, 4, 5, 12, and 24, however, meet the requirements of the three-prong test and are deemed to be proper usage of means plus function language. Therefore the claims are interpreted to include the limitations as described in the specification and their equivalents. In regards to claims 2, 4, 5, and 24, the means for detecting the projections, extrapolating data, and smoothing the extrapolated data, is interpreted to be

the common evaluation unit and central processor (element 8 in figures 1 and 2) connected to both the CT detector and the PET detector which perform all computing methods. In regards to claim 12, the means for determining coincident gamma radiation that is generated by positron decay events is interpreted as the PET detector elements.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Page 10, paragraph 36 of the specification refers to reflection at the last channel as a method of extrapolation of data. This statement is not a sufficient disclosure to support the method of claim 16 wherein point reflection is used as an extrapolation method and is not fully enabling to one of ordinary skill in the art.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-10, 12-15 and 17-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Lonn, et al (US 6856666). Lonn discloses a combined emission tomography and computer tomography unit (col 1, lines 15-19) which includes a scintillation detector (col 2, line 6) and an evaluation unit for recording radiation emitted from the object to be examined (col 2), a computer tomography unit including a rotating source (figure 2, element 14) from which a fan-shaped radiation beam emanates (figure 2). The radiation source emanates from a focus of the radiation source that is an x-ray source moveable on a circular gantry (col 4, lines 58-62), as is known in a third generation CT system. The data of the emission tomography unit is corrected using the attenuation distribution obtained through examination by the CT system (figure 14), wherein the reconstruction field is larger than the measuring field (col 8, lines 10-12). A computer (figure 2, element 36) is included and programmed to "perform functions described herein" (col 7, line 40) which computes the extrapolation of the measured data and smoothing the data. The measuring field and the reconstruction field, i.e. the extended field of view (FOV), which includes the extrapolated data, include a circular contour (figure 2) arranged concentrically (figure 9) in which the reconstruction field goes beyond the measuring field (figure 9). The ET/CT unit includes a dedicated radiation detector for the detection of x-ray radiation, as seen in figure 11 with two separate scan planes, and therefore two separate detector elements. The PET detector elements

detect coincident gamma radiation that is generated by positron decay events (col 6, lines 1-9). Attenuation information from the CT scan is used in the reconstruction of PET images for a portion of the patient that extends beyond the CT FOV (col 1, lines 49-53). CT values are "converted into attenuation values corresponding to the 511 keV photon energy" (col 13, lines 26-27) which converts the attenuation coefficients to those expected with reference to ET radiation at 511 keV. Extrapolation is used to determine values for the region outside the truncated projection (col 9) which uses the slope to estimate beyond the truncated projection boundaries, as "human anatomy typically does not change quickly over a small distance, the boundary samples and the slopes estimated from the neighboring rows do not typically vary significantly" (col 9, lines 26-29), taken to broadly be a form of linear extrapolation. Smoothing is done (col 13, lines 28-29) which matches the resolution of the CT to the functional PET image.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lonn in view of Balan, et al (WO 0075691). Lonn, as discussed above, substantially discloses the invention as claimed, however fails to disclose using identical detectors for both the CT and the ET radiation detectors. However, Balan teaches that

"devices which utilize the same detector for acquiring both emission and transmission images have been reported as well as devices which utilize different detectors for acquiring images" (page 1, lines 16-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Lonn with the teaching of Balan, as only one gantry would be necessary for both detector systems, thereby reducing the size of the system.

In regards to claim 14, Lonn discloses the use of the CT and PET systems as merely illustrative example and that any multi-modality system may be used, however does not specifically disclose the use of a SPECT system. Balan discloses that PET or SPECT imaging may be used (page 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Lonn with the disclosure of Balan, as Balan further states that "it is well known when producing SPECT or PET images to correct the images for the effect of attenuation of the gamma rays" (page 1).

3. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lonn in view of Flohr, et al (US 6307909). Lonn, as discussed above, substantially discloses the invention as claimed, however fails to disclose the use of point reflection as an extrapolation method. Flohr, also disclosing a method for attenuation correction, discloses the use of point reflection extrapolation (col 7, line 48). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the disclosure of Lonn with the teaching of Flohr, as Flohr states it is "a particularly

preferred type of extrapolation" (col 7, line 26) for use in the same process which Lonn is disclosing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Horwat whose telephone number is (571) 272-2811. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jah
11/9/2005

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